NORTH CAROLINA FOREST SERVICE
2018 Forest Health Highlights

Our Forests

North Carolina's forests cover 18.6 million acres, about 60 percent of the state's land area. Most of this (11.3 million acres) is owned by individuals, families, and non-corporate entities. About 2.9 million acres is owned by private corporations not involved in forest product manufacturing and about 1.3 million acres is owned by forest industry. Public lands (federal, state and local) total 2.6 million acres. Forestry is an important industry in the state, providing nearly 180,000 jobs.

North Carolina's forests are also prized for their scenic beauty, supporting tourism and outdoor recreation, and providing wildlife habitat from the Appalachian Mountains to the lowlands of the Atlantic Coastal Plain. The beauty and productivity of North Carolina's forests have historically been challenged by a variety of threats, both native and non-native. In recent years, three non-native invasive species were detected for the first time in the state: **laurel wilt** (2011), **thousand cankers disease** of walnuts (2012), and **emerald ash borer** (2013).

Firewood Awareness

A primary mission of the North Carolina Forest Service (NCFS) Forest Health Branch is to increase awareness about the potential to move tree-killing invasive insects from one area to another in firewood. In 2018, the NCFS continued its awareness campaign through annual outreach events such as the N.C. State Fair and BugFest. Interactive displays encourage residents to use local, treated, or inspected firewood to reduce the risk of moving invasive pests. This year, the firewood message was brought to the minor leagues through a partnership with the Carolina Mudcats, a minor league baseball team (see image below). This collaboration helped the message reach over 80,000 fans at the stadium, over 50,000 twitter users, and over 75,000 Facebook users.

Invasive Pests

Emerald Ash Borer Detected in Four Additional Counties in North Carolina:

Since its initial detection in N.C. in 2013, the **emerald ash borer (EAB)** has been found in 37 counties across the state, four of them being new detections in 2018: Halifax, Jackson, Macon, and Transylvania. In 2015, the entire state was placed under state and federal **quarantines** to prevent the spread of this pest to non-infested areas. A map of the current known distribution of emerald ash borer in N.C. can be found here: Emerald Ash Borer Range Map

This year, the NCFS launched a new program to protect ash trees in urban settings. The Ash Protection Program partially reimburses communities for pesticide treatments of their urban ash resources. In 2018, seven communities participated in this program, protecting over 200 ash trees. This program will continue into 2019.

While pesticides are a viable option to manage EAB in urban or landscape settings, it is not in forest settings. Research related to long-term management strategies is ongoing and includes the release of parasitoid wasps native to Asia as part of a national biocontrol program. Through cooperative efforts with the United States Department of Agriculture, Animal and Plant Health Inspection Service (USDA-APHIS), NCFS Forest Health staff became a part of this biocontrol effort in 2013 by releasing parasitoid wasps at several sites in Granville, Vance, and Wayne Counties.

The NCFS Forest Health Branch and N.C. Department of Agriculture & Consumer Services (NCDA&CS) – Beneficial Insect Lab (BIL) collaborated with the USDA-APHIS Emerald Ash Borer Biocontrol Program to study the phenology of EAB in N.C. to best determine when and what species of wasps to release. As part of the phenology study, infested ash trees were cut (see image below), debarked, and EAB life stages recorded. The NCFS and BIL did this research in 2017 and 2018 and plan to continue it in 2019.

Hemlock Woolly Adelgid and the Hemlock Restoration Initiative:
The hemlock woolly adelgid (HWA) was first detected in N.C. in 1995 and has since spread to all regions where hemlocks naturally occur in the state. Hemlocks continue to suffer at an alarming rate from these infestations.

Three years ago, a cooperative effort between the NCDA&CS, WNC Communities, U.S. Forest Service, and NCFS formed the Hemlock Restoration Initiative (HRI). Through this effort, HRI and NCFS staff plan and implement treatment projects. Treatments are ongoing, but at the date of this publication (12/3/2018), 24,611 hemlocks on state lands had been treated in 2018 alone. For long-term management efforts to protect hemlocks, HRI continues to release predatory beetles that prey on the adelgids.

Gypsy Moth Program:
The entire state of North Carolina has been monitored for **gypsy moth** since 1982 through a program of the NCDA&CS – Plant Industry Division. The 2018 trapping season is complete; 594 moths were captured in 343 traps (with a total of 18,786 traps set statewide). This is much fewer captures compared with last year (2017) when 1,613 moths were captured in 868 traps (19,869 traps set statewide).

Based on these trap captures, four treatment areas totaling 3081 acres are proposed for 2019. In 2018, 11 treatments at 10 sites were conducted with mating disruption or *Btk*.

The gypsy moth has historically been held at bay from becoming established in North Carolina, with only two counties being quarantined for the pest since 1988 (Currituck County and parts of Dare County). These two counties remain the only two with a gypsy moth quarantine in place.

Thousand Cankers Disease Remains Only in Haywood County:
Since 2012, when **thousand cankers disease (TCD)** was first detected in Haywood County, North Carolina, neither the fungus nor the **walnut twig beetle** that carries it have been found in additional counties within the state. A quarantine was enacted in January 2013 that prohibits the movement of regulated materials from Haywood County to unaffected areas of the state.

The NCFS works with the United States Department of Agriculture Forest Service (USFS) and North Carolina Department of Agriculture and Consumer Services Plant Industry Division (PID) to trap and survey for newly affected areas in the state. In 2018, 89 traps were set statewide (NCFS and PID) and the walnut twig beetle was not found in additional areas. A map of the current known distribution of thousand cankers disease of walnuts in N.C. can be found here: Thousand Cankers Disease Range Map

Laurel Wilt Detected in One Additional County in 2018:
The devastating **laurel wilt disease** was first confirmed in North Carolina in 2011. This year, it was detected in Cumberland County, bringing the total to ten positive counties in the southeastern part of the state. Laurel wilt was previously detected in Bladen, Brunswick, Columbus, Duplin, New Hanover, Onslow, Pender, Robeson, and Sampson Counties. A map of the current known distribution of laurel wilt in N.C. can be found here: http://www.ncforestservice.gov/forest_health/pdf/Map_LW_NCTracking.pdf

Native Pests

Bark Beetles:
The **southern pine beetle (SPB)** has historically been North Carolina's most significant forest insect pest. From 1999 through 2002, SPB killed at least $84 million worth of timber in North Carolina. Since then, beetle activity has been relatively low. In 2017, however, activity picked up with 54 SPB spots totaling approximately 222 acres

were detected on state and private lands. This year, activity was similar, with 53 SPB spots totaling 218 acres detected on state and private lands.

This spring, the NCFS set 39 SPB prediction traps across the state. These traps, plus additional traps deployed by the USFS, indicated that low SPB populations should be expected across most of the state, with the exceptions of traps located in the Cheoah Ranger District (Nantahala National Forest), Macon County, Croatan National Forest, and Appalachian Ranger District (Pisgah National Forest). A full report of 2018 SPB predictive trapping in N.C. can be found here: NC Forest Service Newsletter

The **Southern Pine Beetle Prevention Program**, funded through a grant from the USDA Forest Service, partially reimburses non-industrial private forest landowners in North Carolina for the cost of pre-commercial thinning of pine stands. During a pre-commercial thinning, trees with no commercial value are removed to allow remaining trees to grow with less competition for nutrients and sunlight. Such thinning improves the health of the remaining trees and reduces the stand's susceptibility to the southern pine beetle. Since the program began, over 74,000 acres in N.C. have been treated through this program to encourage proper management conditions for pine stand health and to reduce the likelihood of southern pine beetle infestations. Most of the acres treated are related to thinning of overstocked young pine stands.

Defoliators:

Compared with 2017, there were fewer major defoliation events observed this year. Native foliage-damaging pests cause damage that is mainly unsightly, but they usually have little impact on healthy trees in the long-run.

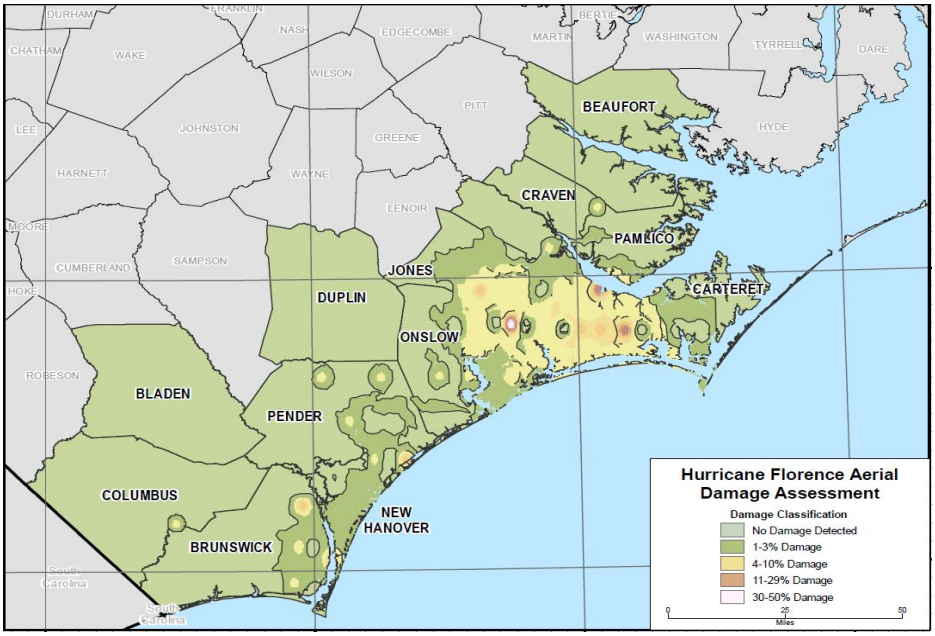
The **forest tent caterpillar** is a caterpillar that defoliates bottomland hardwoods. In 2018, North Carolina experienced its fourth consecutive year of forest tent caterpillar outbreak. Through remote sensing and ground observation, an estimated 272,712 acres was impacted. Trees recovered by summer and no mortality was observed.

Abiotic Forest Health Issues

This spring, **late season frost** led to widespread impacts to oak foliage growth and development in higher elevations of NC. Neighboring states (KY, TN, VA, & SC) also reported the same but damage across the region varied from mild to severe. Many developing leaves and buds were killed from the weather event(s) and surviving leaves suffered necrotic tissue or became stunted, chlorotic, or curled. Damage was recorded on numerous oak species in both the red and white oak groups and there will likely be no long-term health impacts.

In September 2018, **Hurricane Florence** devastated North Carolina's coast. It brought wind gusts of more than 100 mph, a pre-landfall storm surge that flooded numerous coastal communities, and record-breaking rainfall for the next several days. The destruction left in her wake devastated the Coastal Plain of North Carolina. While much of the damage was due to flooding, it was the combination of high winds and saturated soils that led to downed and damaged trees.

Areas most affected by hurricane force winds were aerially surveyed. The heaviest timber damage appeared in Craven, Carteret, Onslow, and Jones Counties within 40 miles of the coast. Forest edges suffered the greatest impact. In addition to downed and broken trees throughout the Coastal Plain, hardwood trees had sparse foliage on the windward side because of high sustained winds. In all, an estimated 1,251,312 acres of forestland received some level of damage, causing an estimated $69.6 million in damage (see damage map below).



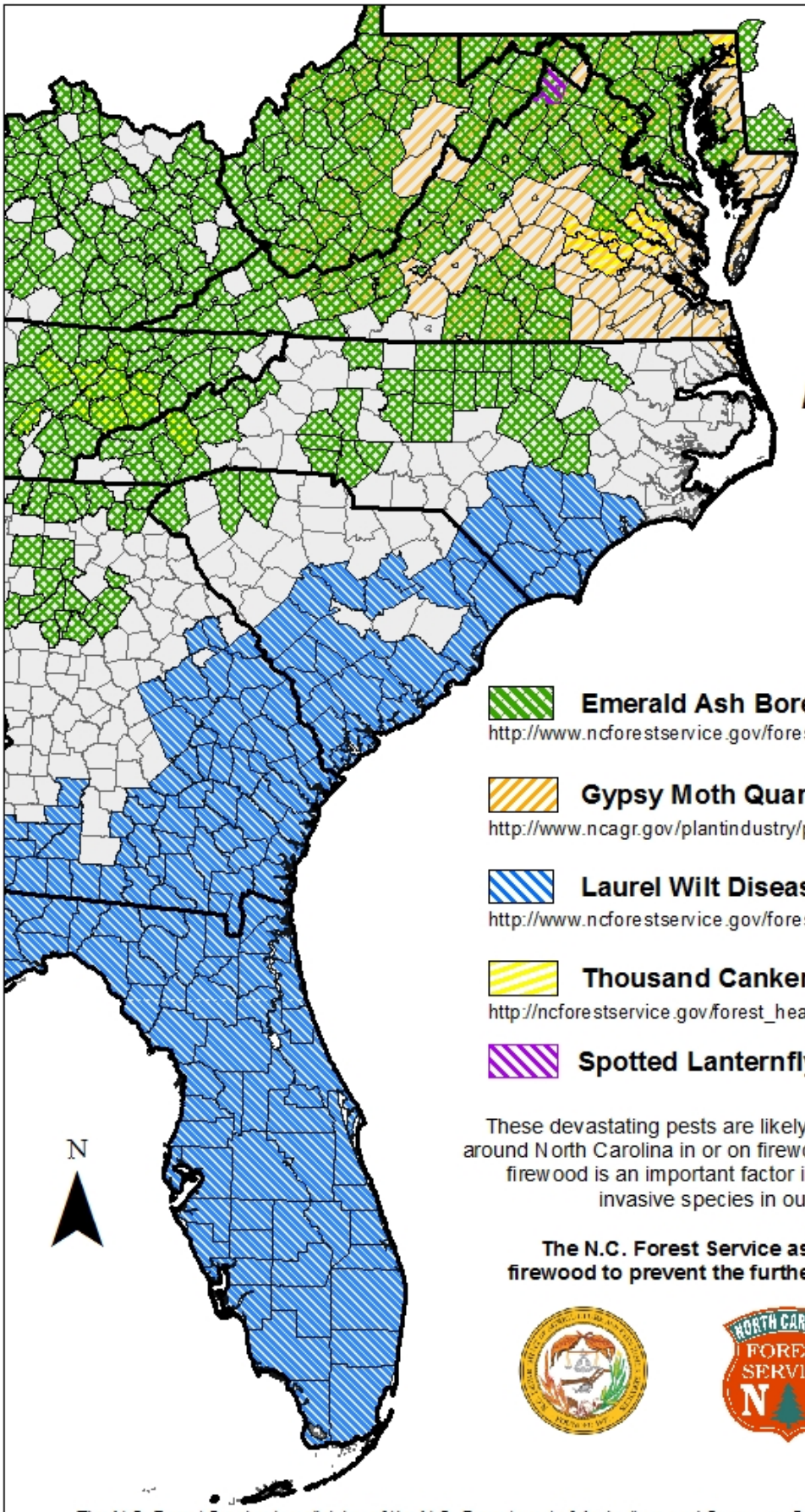
Forest Health Assistance in North Carolina

With assistance and support from the USDA Forest Service, the NCFS is responsible for providing assistance to the forest landowners of the state in the detection and control of destructive forest insects and diseases. Forest Health Specialists in the Forest Protection Division direct this responsibility. Services are provided to forest landowners by district and county personnel with the Forest Health Section staff providing appropriate training along with professional and technical expertise in the diagnosis and control of destructive insects and diseases.

North Carolina Department of Agriculture & Consumer Services
N.C. Forest Service
Forest Health Branch
1616 Mail Service Center
Raleigh, North Carolina 27699-1616
919-857-4858
NC Forest Service Forest Health Branch website

United States Department of Agriculture Forest Service
Southern Region, State & Private Forestry
Forest Health Protection
200 W.T. Weaver Road
Asheville, North Carolina 28804
828-257-4320
USDA Forest Service Forest Health Protection link

The North Carolina Forest Service is an equal opportunity employer. Its programs, services, activities, and employment opportunities are available to all people regardless of race, color, religion, sex, age, national origin, disabilities, or political affiliation.



Where are they now?

Monitoring Firewood-Vectored Invasive Forest Pests in North Carolina

Emerald Ash Borer
http://www.ncforestservice.gov/forest_health/fh_eabfaq.htm

Gypsy Moth Quarantine
http://www.ncagr.gov/plantindustry/plant/entomology/gm.htm

Laurel Wilt Disease
http://www.ncforestservice.gov/forest_health/forest_health_laurelwiltfaq.htm

Thousand Cankers Disease
http://ncforestservice.gov/forest_health/forest_health_thousandcankers.htm

Spotted Lanternfly

N

These devastating pests are likely to be brought into or moved around North Carolina in or on firewood. The use of local or treated firewood is an important factor in preventing the spread of invasive species in our state's forests.

The N.C. Forest Service asks that you use local firewood to prevent the further spread of forest pests.

Map Created 11/28/2018
by Kelly Oten - FHM Coordinator

The N.C. Forest Service is a division of the N.C. Department of Agriculture and Consumer Services; Steve Troxler, Commissioner.